

SURVEY OF ETHYL CARBAMATE IN FOOD AND BEVERAGES

Summary

A survey was undertaken to measure the concentration of ethyl carbamate in selected foods and alcoholic beverages (excluding whisky), which could potentially contain ethyl carbamate.

Seventy-five samples of beverages / liquid condiments and twenty-five food samples were purchased from retail outlets around the UK. Of the 100 samples analysed forty had quantifiable levels of ethyl carbamate. The highest concentration of ethyl carbamate found (6.13 mg/kg) was in the only sample of kirsch analysed. There are currently no EU or UK regulatory limits for ethyl carbamate in food or drink.

At its 64th meeting in February 2005, the Joint FAO/WHO Expert Committee on Food Additives (JECFA) considered ethyl carbamate and produced a summary report.² Details of the summary report can be found at: ftp://ftp.fao.org/es/esn/jecfa/jecfa64_summary.pdf

JECFA concluded that the intake of ethyl carbamate from foods excluding alcoholic beverages was much lower than the amounts shown to cause cancer in laboratory animals and was therefore of low concern. However, alcoholic beverages added a much larger amount to the total intake of ethyl carbamate, and this was a concern. JECFA therefore recommended that mitigation measures to reduce concentrations of ethyl carbamate in some alcoholic beverages should be continued.

The Agency is working with the manufacturers to ensure that good manufacturing practices are in place to reduce the level of ethyl carbamate in alcoholic beverages. The results of the survey do not affect Agency advice on what people should eat or drink.

Introduction

Ethyl carbamate is a chemical formed naturally during fermentation of food and beverages. It has been shown to be a genotoxic carcinogen in animals and is considered to be a

potential carcinogen in humans. The cancer risk cannot be quantified but it will increase with increasing exposure to ethyl carbamate.

Since the early 1990's the whisky industry has taken steps to reduce the level of ethyl carbamate in whiskies by selecting barley varieties with naturally low levels of precursors of ethyl carbamate and by using conditions that control key formation parameters such as contact with copper. Industry is continuing to work in this area to reduce levels of ethyl carbamate in other alcoholic beverages by modifying production processes.

This survey aims to obtain up to date information on the levels of ethyl carbamate in food available in the UK. It was commissioned to feed into the JECFA evaluation to improve our understanding of ethyl carbamate and to gather data to inform possible future discussions in Europe. An Agency funded survey to measure ethyl carbamate in whisky was completed in 2000.³ Full details can be found at:

<http://www.food.gov.uk/science/surveillance/fsis-2000/2whisky>

Sampling

In this survey 75 samples of beverages / liquid condiments samples and 25 food samples were analysed. The beverage samples comprised beer, ale and cider, dark spirits (brandy and rum) and liqueurs (eg kirsch), fortified wines (Madeira, port and sherry) and wine. The condiments were soy sauces and vinegars. Sampling of soy sauce was focused on fermented soy sauces.

The food samples comprised cheeses; yoghurts, soybean pastes, sauerkraut, yeast extract, olives and Christmas pudding. Products such as sauerkraut, yoghurt and olives were included in the survey, as ethyl carbamate has been detected at low levels in published studies.^{4, 5, 6} A sample of Christmas pudding was included in the survey, as this type of food has not been tested previously in the UK and can contain alcohol. Ventress Technical Services Ltd purchased the samples from retail outlets across the UK. Full details of the samples are given in **Appendix 1**.

Although the samples were taken to reflect market share, a wide range of brands were covered in order to ensure that the survey was representative of the supply of the products to consumers in the UK. The absence of a particular brand in Appendix 1 means only that the product was not included in the survey.

Methodology

The Association of Analytical Communities (AOAC) first action method, validated by collaborative trial, and suitable for measurement of ethyl carbamate in beverages and liquid condiments such as soy sauce and vinegar, was used involving gas chromatography mass spectrometry with d5-labelled ethyl carbamate as an internal standard.

The method for solid foods was a gas chromatography mass spectrometry method developed from published procedures¹ and validated in-house to confirm its suitability for the target food matrices. This is because the laboratory was unable to achieve United Kingdom Accreditation Service (UKAS) accreditation for ethyl carbamate in the food matrices analysed. However, the method was tested in accordance with the IUPAC Harmonised Guidelines for single laboratory validation of methods of analysis.⁷ Full details of validation data are given in Tables 1 and 2.

For both methods the limit of detection was 0.001 mg/kg and the limit of quantification was 0.010 mg/kg. Samples were homogenised and divided into three sub samples, for analytical, defence and referee purposes. Only the analytical sample was analysed by CSL in the survey, the defence sample was reserved for analysis by brand owners at their request and the referee sample was reserved for reference purposes. Prior to analysis, chilled foods were kept in a secure store at 4 °C and frozen samples at -20° C. All the sub samples were stored at -20°C.

Quality Assurance (QA)

Validation of the methods was carried out on a variety of beverages and liquid condiments including spirits, fortified wine, soy sauce, vinegar and wine. Validation of the methods for foods included yoghurt, cheese, and cake.

All samples were analysed five times in different batches on separate days. D-5- labelled ethyl carbamate was used as the internal standard in preference to n-propyl carbamate, since it would allow for more precise recovery correction. Each batch contained a sample of each matrix spiked close to the limit of detection and spiked at a mid range. Each batch also contained a control sample of 40% ethanol solution containing 0.1mg/kg ethyl carbamate.

The following quality assurance criteria were all met.

- The correlation coefficients of all calibration standard solutions were 0.99 or greater.
- All reagent blank samples showed a response of less than 0.004 mg/kg.
- All determinations of ethyl carbamate in the reference materials were within two standard deviations of the characterised value.
- The ethyl carbamate peak area ratios of all samples were within the range of the calibration standards.
- The retention times of the sample ethyl carbamate peaks were within 0.2 minutes a standard.

Measurement uncertainty

Analytical results have variability known as measurement uncertainty (MU). For any analytical method each result is reported as the best estimate for the sample and it is always qualified by a measurement of uncertainty (e.g. x micrograms/kilogram \pm y micrograms/kilogram). For this survey the calculation of MU was carried out by CSL in accordance with Eurachem guidelines.⁸ Details are given in Appendix 1.

Results

All the analytical results reported by this survey are given as the best estimate values, corrected for recovery, but do not take into account the measurement uncertainty.

Beverage & Liquid Condiments Samples

Results for the beverage and condiments samples are summarised in Table 3. Ethyl carbamate was not detected in any of nine beers or the single cider sample. Seven of 13 wines contained ethyl carbamate, at levels between 0.011mg/kg and 0.024 mg/kg with no apparent difference between red and white types. Two samples of sake contained ethyl carbamate, at 0.081 mg/kg and 0.164 mg/kg. All 15 samples of fortified wines contained ethyl carbamate, at levels between 0.014mg/kg and 0.060 mg/kg (mean 0.032 mg/kg). There was no apparent difference between ports, sherries and other types of fortified wines.

Two of six stone fruit brandies, one from cherries and one from plums did not contain detectable levels of ethyl carbamate. The remaining four stone fruit brandies contained levels ranging from 0.012 mg/kg to 6.13 mg/kg, the highest level being in a sample of kirsch. Two samples of rum contained ethyl carbamate at 0.016 mg/kg and 0.072 mg/kg, and two samples of brandy at 0.016 mg/kg and 0.041 mg/kg. Ethyl carbamate levels were generally low in all but one liqueur sample, which was reported as 0.17mg/kg.

Ethyl carbamate was detected, at the limit of quantification in only one of the ten soy sauce samples. Only a single sample of vinegar, produced from sherry, contained ethyl carbamate, this at 0.033 mg/kg.

Food samples

Results of the food samples are summarised in table 3. Ethyl carbamate was found only in three solid samples; Christmas pudding at 0.020 mg/kg, in sauerkraut in white wine at 0.029 mg/kg, and in yeast extract at 0.041 mg/kg.

Conclusion

As expected, wine, fortified wine, dark spirits and liqueurs generally contained quantifiable levels of ethyl carbamate. The highest level of ethyl carbamate was found in the only sample of kirsch analysed. Levels of ethyl carbamate in seasonal desserts such as Christmas pudding have not been reported previously in the UK. The sauerkraut samples contained white wine and the Christmas pudding contained dark spirit, so the presence of the ethyl carbamate in these samples might be from the wine or spirit component.

This survey is part of the Agency's research and surveillance programme of ethyl carbamate in food and drinks. Information from an agency funded research project investigating the levels of ethyl carbamate in bread will be available in the near future.

Agency Action

In accordance with Agency survey guidelines, the Agency contacted the manufacturer/retailer/importer of each product that was above the LOQ (0.010 mg/kg) to inform them of their results. They were also given the opportunity to comment on the survey results. Comments are included in the Annex.

Advice to consumers

In line with the recent JECFA conclusions, which took into account the numerical results from this survey, the Agency is working with the manufacturers to ensure that good manufacturing practices are in place to reduce the level of ethyl carbamate in alcoholic beverages. The results of the survey do not affect Agency advice on what people should eat or drink and it continues to recommend that people should eat a healthy balanced diet containing lots of fruit and vegetables. In addition, advice on alcohol consumption can be found at <http://www.eatwell.gov.uk/healthydiet/nutritionessentials/drinks/alcohol/>

Summary of Units

Milligram (mg): one thousandth of a gram

Millilitre (ml): one thousandth of a litre

Kilogram (kg): one thousand grams

Litre (L): one thousand millilitres

Milligram per kilogram (mg/kg)

References

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7. Thompson M., Ellison S.L.R., and Wood R., Harmonised guidelines for single-laboratory validation of methods of analysis – (IUPAC technical report). *Pure Appl. Chem* , 2002, **74**, 835-855.
8. Ellison., S. L. R., Rösslein M., and Williams A., *Quantifying Uncertainty in Analytical Measurement, Eurachem/CITAC Guide, Eurachem*. Berlin, 2nd (ed.) 2000

Further Information

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A copy of the final report of this survey has been placed in the FSA Library – address details below. If you wish to consult a copy, please contact the library for an appointment giving at least 24 hours notice or, alternatively, copies can be obtained from the Library: a charge will be made to cover photocopying and postage.

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Table 1 : Validation data for beverage and liquid condiment samples

	spike level (mg/kg)	Ethyl carbamate (mg/kg)					Average	Std Dev	RSD%	Average recovery (%)	MU (mg/kg)
		Batch 1	Batch 2	Batch 3	Batch 4	Batch 5					
40 % ethanol AOAC practice sample	0.100	0.086	0.093	0.091	0.087	0.088	0.089	0.00275	3.1	89	
Gin	0.100	0.082	0.083	0.079	0.080	0.081	0.081	0.00165	2.0	81	0.008
	0.010	0.010	0.011	0.012	0.012	0.008	0.011	0.00175	16.2	108	0.004
Sherry	0.075	0.062	0.063	0.064	0.064	0.062	0.063	0.00061	1.0	84	0.006
	0.010	0.010	0.012	0.012	0.013	0.009	0.011	0.00158	14.2	111	0.003
Soy sauce*	0.057	0.048	0.047	0.049	0.048	0.048	0.048	0.00074	1.5	84	0.004
	0.012	0.009	0.010	0.010	0.011	0.009	0.010	0.00056	5.7	82	0.001
Cider vinegar	0.050	0.035	0.035	0.037	0.036	0.037	0.036	0.00080	2.2	72	
	0.020	0.016	0.017	0.017	0.015	0.017	0.016	0.00092	5.6	82	
Cider vinegar (Neutralised)	0.050	0.035	0.036	0.036	0.036	0.036	0.036	0.00044	1.2	72	0.004
	0.020	0.016	0.017	0.017	0.017	0.017	0.016	0.00037	2.2	82	0.002
Wine	0.050	0.040	0.042	0.043	0.041	0.044	0.042	0.00162	3.9	84	0.004
	0.010	0.012	0.011	0.013	0.012	0.012	0.012	0.00069	5.9	117	0.002

* Soy sauce contained 0.007 mg/kg ethyl carbamate before spiking with 0.050 mg/kg for the high level and 0.005 mg/kg for the low level.

Table 2 : Validation data for food samples

	spike level (mg/kg)	Ethyl carbamate (mg/kg)					Average	Std Dev	RSD%	Average recovery (%)	Measurement uncertainty (mg/kg)
		Batch 1	Batch 2	Batch 3	Batch 4	Batch 5					
40 % ethanol AOAC practice sample	0.100	0.076	0.074	0.088	0.081	0.073	0.078	0.061	7.7	78	
Yoghurt	0.010	0.010	0.009	0.009	0.010	0.009	0.010	0.0045	4.7	96	0.002
	0.050	0.034	0.035	0.033	0.037	0.035	0.035	0.0152	4.3	70	0.009
Cheese	0.010	0.014	0.013	0.006	0.009	0.010	0.010	0.0333	32.0	104	0.007
	0.050	0.037	0.029	0.033	0.030	0.034	0.033	0.0344	10.5	66	0.015
Vegetables*	0.013	0.011	0.011	0.007	0.015	0.009	0.011	0.0270	25.1	81	0.007
	0.053	0.042	0.032	0.032	0.048	0.050	0.041	0.0856	20.9	82	0.023
Cake	0.10	0.010	0.009	0.009	0.009	0.009	0.009	0.0062	6.7	93	0.002
	0.050	0.041	0.040	0.040	0.040	0.039	0.040	0.0087	2.2	80	0.008
Sauce**	0.019	0.018	0.017	0.017	0.016	0.18	0.017	0.0090	5.2	80	0.005
	0.059	0.071	0.047	0.053	0.052	0.051	0.055	0.0919	16.8	91	0.011

* Pickled vegetables contained 0.003 mg/kg ethyl carbamate before spiking with 0.050 mg/kg for the high level and 0.010 mg/kg for the low level.

** Sauce contained 0.009 mg/kg ethyl carbamate before spiking with 0.050 mg/kg for the high level and 0.010 mg/kg for the low level.

Table 3: Summary of results

Samples	Tested	ethyl carbamate	Range (mg/kg)
Dark Spirits & Liqueurs (stone fruit brandy)	6	4	NQ - 6.131
Dark Spirits & Liqueurs (brandy, Calvados, Rum)	9	7	NQ - 0.170
wine (Sake)	2	2	0.081 – 0.164
Fortified Wine (Madeira, port, sherry)	15	15	0.014 - 0.060
Other foods (sauerkraut, Christmas pudding, yeast extract)	3	3	0.020 - 0.041
Vinegar	10	1	NQ - 0.033
Wine (not sake)	13	7	NQ - 0.024
Soy sauce	10	1	NQ - 0.010
Olives	3	–	–
Fermented dairy products	12	–	–
Fermented soy products	7	–	–
Beer and ale (also lager and cider)	10	–	–

NQ = not quantified, i.e. <0.010

Appendix 1 Survey of Ethyl Carbamate in Food & Beverages

SAMPLE CODE	PRODUCT AS DESCRIBED ON THE LABEL	BRAND	CATEGORY	BEST BEFORE DATE	BATCH CODE	UNIT SIZE	COUNTRY OF ORIGIN	PACKAGING	Retailer Code	[Ethyl carbamate] / mg/kg	Measurement Uncertainty / (mg/kg)
04070070	Biere Belge Blonde	Abbaye de Leffe	Beer / Ale – Lager	19/10/2005	L60	75cl	Belgium	Bottled	1	<0.010	
04070071	Chianti Classico Riserva 1999	Tesco Finest	Wine - Red	None declared	1L.4100 and A2348737	75cl	Italy	Bottled	1	0.011	0.002
04070072	Balsamic Vinegar	Fattorie Giacobazzi	Vinegar - Balsamic	MAY.2007	L.4/146B and BQ 117735 & BQ 117740	250ml	Italy	Bottled	1	<0.010	
04070073	Vinos Finos de Rioja 1993	Vina Gravonia	Wine - White	None declared	L7649 and No. 025885	75cl	Spain	Bottled	2	0.024	0.004
04070074	Trebbiano d'Abruzzo	Vendemmia 1993	Wine - White	None declared	None declared	75cl	None declared	Bottled	2	0.011	0.002
04070075	Superior Light Soy Sauce	Pearl River Bridge	Soy Sauce	15/03/2006	EU09 A4062 PDT15MAR04	600ml	China	Bottled	3	0.010	0.003
04070076	Superior Dark Soy Sauce	Woh Hup Food Industries (PTE) Ltd	Soy Sauce	31.03.2006	3282C3	750g	Singapore	Bottled	3	<0.010	
04070077	Haut-Medoc	Les Charmilles du Chateau Cissac 1999	Wine - Red	None declared	L40318	75cl	France	Bottled	4	<0.010	
04070078	Finest Reserve Port	Asda	Fortified Wine - Port	None declared	L 3308 PAS and 992397	750ml	Portugal	Bottled	4	0.028	0.005
04070079	Rich Cream Sherry	Asda	Fortified Wine - Sherry	None declared	L-4163 and 27075679	70cl	Spain	Bottled	4	0.024	0.004
04070080	Rich Madeira Duke of Clarence	Blandy's	Fortified Wine - Madeira & Other	None declared	L3266 and 078206	75cl	Madeira	Bottled	4	0.044	0.006
04070081	Cider Vinegar	Asda	Vinegar - Apple	None declared	L11104	500ml	France	Bottled	4	<0.010	
04070082	1998 Meursault	Tesco Finest	Wine - White	None declared	L 2030	75cl	France	Bottled	5	0.011	0.002
04070083	Marques de Chive Reserva 1997	Utiel-Requena selected by Tesco	Wine - Red	None declared	L-3210 and No. 366760	75cl	Spain	Bottled	5	0.016	0.003
04070084	1999 Trittenheimer Apotheke Riesling-Spatlese	Grans-Fassian	Wine - White	None declared	None declared	750ml	Germany	Bottled	5	<0.010	

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04070085	Japanese Choya Sake	Choya	Wine - Sake	None declared	L-151003A	72cl	Japan	Bottled	5	0.081	0.013
04070086	Clouded Yellow	St Austell	Beer / Ale	24-06-05	None declared	500ml	None declared	Bottled	5	<0.010	
04070087	Seasoning Soy Sauce Higeta/Teriyaki Sauce	Korea Foods Ltd	Soy Sauce	2005.2	EDAB CK	250ml	Japan	Plastic bottle	6	<0.010	
04070088	Reduced Salt Soy Sauce	Amoy	Soy Sauce	SEP2005	4070K	150ml	Hong Kong	Bottled	7	<0.010	
04070089	Sherry Vinegar	Ellsey & Co	Vinegar - Sherry	None declared	2245	2 litres	None declared	Plastic bottle	6	0.033	0.010
04070090	Jerez Xeres Sherry Extra Dry Palomino Fino	Tio Pepe	Fortified Wine - Sherry	None declared	L-Y0810W and MFF 54070469	750ml	None declared	Bottled	8	0.037	0.005
04070091	Red Wine Vinegar	Morrisons	Vinegar - Wine	None declared	L04904	500ml	None declared	Bottled	8	<0.010	
04070092	Sarget de Gruaud-Larose 1997 Saint-Julien	S.A. Chateau Gruaud-Larose	Wine - Red	None declared	None declared	75cl	France	Bottled	8	0.018	0.003
04070093	Oyster Stout	Marston's	Beer / Ale	31 MAY 05	4062 208A	500ml	None declared	Bottled	8	<0.010	
04070094	Sweet (Soya Bean Sauce)	Habhal's	Soy Sauce	01052007	BN 120301	645ml	Malaysia	Bottled	9	<0.010	
04070095	Plum Brandy Liqueur	Moniack	Dark Spirits & Liqueurs - Stone Fruit Brandy	2005	1L2224 and 16050211:00 (very faint near bottom of bottle)	70cl	None declared	Bottled	10	<0.010	
04070096	Special London Ale	Young's	Beer / Ale	APR 05	LOT 2	500ml	None declared	Bottled	11	<0.010	
04070097	Original Superior Sherry	Harvey's Bristol Cream	Fortified Wine - Sherry	None declared	L41311	75cl	Spain	Bottled	11	0.018	0.004
04070098	Rose Western Cape 2003	Kumala	Wine - Rose	None declared	L4 074 D and 506555 3674	75cl	South Africa	Bottled	12	<0.010	
04070099	Finest Madeira	Madeira Wine Company selected for Tesco	Fortified Wine - Madeira and other	None declared	L4093 and 0562849	75cl	Madeira	Bottled	12	0.034	0.005
04070100	Cointreau	CLS Remy Cointreau	Dark Spirits & Liqueurs - Liqueur	None declared	L 1124K	0.70 litres	None declared	Bottled	12	<0.010	
04070101	Cherry Brandy Liqueur	De Kuyper	Dark Spirits & Liqueurs - Stone Fruit Brandy	None declared	L3343030931	50cl	None declared	Bottled	12	0.034	0.004

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04070102	Pusser's Rum	British Navy	Dark Spirits & Liqueurs – Rum	None declared	11880266	70cl	Guyana, Trinidad and British Virgin Islands	Bottled	13	0.016	0.004
04070103	Strong Ale	Co-op Select	Beer / Ale	29/06/05	L181	500ml	UK	Bottled	14	<0.010	
04070104	Coonawarra Botrytis Riesling Vintage 1998	Lindemans	Wine – White	None declared	L9308N3	37.5cl	Australia	Bottled	15	<0.010	
04070105	Medium Dry Amontillado Sherry	Croft Particular	Fortified Wine – Sherry	None declared	L-YD010H and MFV 4645375	750ml	Spain	Bottled	16	0.030	0.005
04070106	Coteaux du Layon Saint-Aubin Les Bruandieres 1997	Domaine Cady	Wine – White	None declared	None declared	50cl	France	Bottled	16	<0.010	
04070107	Elegia Rioja Reserva 1998	Sainsbury's Classic Selection	Wine – Red	None declared	No 274319	75cl	Spain	Bottled	16	0.018	0.003
04070108	Bavarian Style Wheat Beer	Sainsbury's Taste the Difference	Beer / Ale	28 NOV 04	L41492	660ml	UK	Bottled	16	<0.010	
04070109	Red Wine Vinegar	Sainsbury's	Vinegar – Wine	None declared	4172	500ml	UK	Bottled	16	<0.010	
04070110	White Wine Vinegar	Aspall	Vinegar – Wine	020606	4153	350ml	None declared	Bottled	16	<0.010	
04070111	Eclipse Refined Barbados Rum	Mount Gay	Dark Spirits & Liqueurs – Rum	None declared	L1174 D	700ml	Barbados	Bottled	17	0.072	0.007
04070112	10 Year Old Tawny Port	Warre's Otima	Fortified Wine – Port	None declared	L3272	50cl	Portugal	Bottled	17	0.027	0.004
04070113	Red Wine Vinegar	Tesco	Vinegar – Wine	JUN05	L4166	350ml	UK	Bottled	17	<0.010	
04070114	Grand Cru	Hoegaarden	Beer / Ale	04-05-06	22	33cl	None declared	Bottled	17	<0.010	
04070115	High Quality Top Fermented Golden Ale	Duvel	Beer / Ale	06 2007	L0211 0733	330ml	Belgium	Bottled	17	<0.010	
04070116	Apricot Brandy Liqueur	Bols	Dark Spirits & Liqueurs – Stone Fruit Brandy	None declared	L2221 01 0900	500ml	Holland	Bottled	18	0.012	0.004
04070117	Imported Strong Lager	5 Flags	Beer / Ale – Lager	29.05.05	LC1149	660ml	Belgium	Bottled	19	<0.010	
04070118	Danish Cherry Speciality	Kirsberry	Dark Spirits & Liqueurs – Stone Fruit Brandy	None declared	L40300	70cl	Denmark	Bottled	19	<0.010	
04070119	Grand Armagnac – Ans 5 D'age	Janneau	Dark Spirits & Liqueurs – Brandy	None declared	L.211 01	500ml	France	Bottled	19	0.041	0.005
04070120	Crusted Port Bottled 1999	Dow's	Fortified Wine – Port	None declared	L3314 and 835717	75cl	Portugal	Bottled	19	0.029	0.005
04070121	Oyster Sauce	Asda	Soy Sauce	AUG 2005	M4034 A5	150ml	Malaysia	Bottled	19	<0.010	

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04070122	Fortified Wine	Emva Cream	Fortified Wine – Madeira and other	None declared	LE327312:240443	70cl	Cyprus	Bottled	20	0.044	0.006
04070123	Cremovo Vino Aromattizzato All'uovo	Pellegrino	Fortified Wine – Madeira and other	None declared	LO-199 and 120034	75cl	Italy	Bottled	20	0.025	0.004
04070124	Original Liqueur	Plymouth Damson	Dark Spirits & Liqueurs - Liqueur	None declared	L2115	50cl	England	Bottled	20	0.170	0.014
04070125	Napoleon French Brandy	Renoir	Dark Spirits & Liqueurs - Brandy	None declared	L0754 E	70cl	France	Bottled	21	0.016	0.004
04070126	Bordeaux 1999	Chateau Moulin de Gallineau	Wine - Red	None declared	L61143	75cl	France	Bottled	21	<0.010	
04070127	Original Medium Sweet Oloroso Sherry	Double Century	Fortified Wine - Sherry	None declared	L-41482 and 06568888	75cl	Spain	Bottled	22	0.026	0.004
04070128	Special Vintage Cider	Henry Westons	Beer / Ale - Cider	07 06	L4183	500ml	None declared	Bottled	22	<0.010	
04070129	Special Reserve Port	Cockburn's	Fortified Wine - Port	None declared	L2000X and 212481	75cl	Portugal	Bottled	23	0.014	0.004
04070130	The Refined Japanese Sake	Sawanotsuru	Wine - Sake	None declared	4135	720ml	Japan	Bottled	23	0.164	0.026
04070131	Kirsch Eau de Vie	Lesgrevil	Dark Spirits & Liqueurs - Stone Fruit Brandy	None declared	L020421	20cl	France	Bottled	23	6.131	0.502
04070132	Cider Vinegar	Waitrose	Vinegar - Apple	MAR06	4082	500ml	UK	Bottled	23	<0.010	
04070133	Cordon Rouge	Grand Marnier	Dark Spirits & Liqueurs - Liqueur	None declared	L301172	0.50 litres	France	Bottled	23	0.011	0.004
04070134	Apple Balsamic Vinegar	Sainsbury's Taste the Difference	Vinegar - Apple	None declared	4061	350ml	UK	Bottled	24	<0.010	
04070135	Seasoned Rice Vinegar	Mitsukan	Vinegar - Rice	AUG2005	L4173	250ml	None declared	Bottled	24	<0.010	
04070136	Pineau des Charentes	Brillet	Fortified Wine - Madeira and other	None declared	None declared	70cl	France	Bottled	25	0.060	0.008
04070137	Sambuca Liqueur	Ramazzotti	Dark Spirits & Liqueurs - Liqueur	None declared	L3133-114	70cl	Italy	Bottled	25	<0.010	
04070138	Liqueur Cherry-Brandy	Lejay Lagoute	Dark Spirits & Liqueurs - Stone Fruit Brandy	None declared	L03307 C2L2	50cl	None declared	Bottled	26	0.096	0.009

SAMPLE CODE	PRODUCT AS DESCRIBED ON THE LABEL	BRAND	CATEGORY	BEST BEFORE DATE	BATCH CODE	UNIT SIZE	COUNTRY OF ORIGIN	PACKAGING	Retailer Code	[Ethyl carbamate] / mg/kg	Measurement Uncertainty / (mg/kg)
04070139	Premium Soy Sauce	Mama Sita's	Soy Sauce	FEBRUARY 2006	08 04 051	680ml	The Philippines	Bottled	9	<0.010	
04070140	10 Year Old Tawny Port	Taylor's	Fortified Wine - Port	None declared	L0424A/D4 and 009920	75cl	Portugal	Bottled	26	0.041	0.006
04070141	Anee Calvados Pays d'Auge	X.O	Dark Spirits & Liqueurs - Calvados	None declared	L:4 008 60	70cl	France	Bottled	26	0.022	0.004
04070142	Light Superior Soy Sauce	Chain Kwo	Soy Sauce	19.03.06	LOT4219	500ml	China	Bottled	27	<0.010	
04070143	Naturally Brewed Soy Sauce	Kikkoman	Soy Sauce	18.03.2007	None declared	500ml	None declared	Bottled	27	<0.010	
04070144	Thick Soy Sauce	Healthy Boy Brand	Soy Sauce	MAR 2005	None declared	700ml	Thailand	Bottled	27	<0.010	
04100070	Le Veritable Port Salut - 6 original slices	Le Petit Deli	Fermented dairy products	30 11 2004	C251HL	120g	Health mark F 55.119.01 CEE	Plastic tray, heat sealed plastic lid	28	<0.010	
04100071	Corner Fruit Strawberry	Muller	Fermented dairy products	15NOV	None declared	175g	Health mark UK NP005M EEC	Moulded plastic tray, sealed foil lid	28	<0.010	
04100072	Greek Style Natural Yogurt	Sainsbury's	Fermented dairy products	04 NOV	Display until 02 NOV	200g	UK	Plastic tub, sealed plastic lid	28	<0.010	
04100073	French Chevre Blanc	Sainsbury's	Fermented dairy products	02NOV04	Display until 31OCT04	100g	France	Overwrap	28	<0.010	
04100074	Authentic Greek Feta	Fage	Fermented dairy products	24.04.05	PRODUCTION DATE 10.04.04 PACKAGING DATE 20.09.04 SERIAL NUMBER: A FE 3945413 100404	200g	Health mark HELLAS 20.2.385 EU	Heat sealed plastic bag	28	<0.010	
04100075	Silken Tofu	Oriental Dragon	Fermented soy products	301204	None declared	350g	None declared	Plastic tray, heat sealed plastic lid	6	<0.010	
04100076	Shiromiso Soybean Paste White Type	Kurano Kaori	Fermented soy products	31/01/2005	None declared	1kg	Japan	Heat sealed plastic bag	29	<0.010	
04100077	Akamiso Soy Bean Paste Red Type	Kurano Kaori	Fermented soy products	31/01/2005	None declared	1kg	Japan	Heat sealed plastic bag	29	<0.010	
04100078	Stir-fry Sauce – Black Bean	Sharwood's	Fermented soy products	FEB 2006	4231	195g	UK	Glass jar	30	<0.010	
04100079	Sauerkraut in White Wine	Sainsbury's	Other	NOV 2005	K3 321	680g net 540g drained	Germany	Glass jar	31	0.029	0.013

SAMPLE CODE	PRODUCT AS DESCRIBED ON THE LABEL	BRAND	CATEGORY	BEST BEFORE DATE	BATCH CODE	UNIT SIZE	COUNTRY OF ORIGIN	PACKAGING	Retailer Code	[Ethyl carbamate] / mg/kg	Measurement Uncertainty / (mg/kg)
04100080	Yeast Extract	Marmite	Other	DEC 05	8FD	250g	None declared	Glass jar	32	0.041	0.009
04100081	Fromage Frais	Asda Good For You!	Fermented dairy products	17/11	None declared	500g	France	Plastic tub, sealed foil lid	33	<0.010	
04100082	Welsh Medium Cheddar	Tesco	Fermented dairy products	05-DEC	Display until 03-DEC CQ	0.260kg	UK	MAP	34	<0.010	
04100083	Mozzarella	Discover ..	Fermented dairy products	04.12.2004	None declared	200g	Denmark	MAP	35	<0.010	
04100084	French Emmental	Somerfield	Fermented dairy products	21.12.04	279:06 L11	220g	Produced in France Packed in Belgium	MAP	36	<0.010	
04100085	Thick & Fruity Spiced Rhubarb Yogurt	Marks & Spencer Count On Us	Fermented dairy products	16NOV	DISPLAY UNTIL 13NOV	170g	UK	Plastic tub, sealed plastic lid	37	<0.010	
04100086	Spanish Olives Pitted	Carbonell	Olives	26-08-2006	None declared	190g net 95g drained	Spain	Heat sealed plastic bag	38	<0.010	
04100087	Kalamata Olives	Gaea	Olives	MAY/06	L4131	365g net 220g drained	Greece	Glass jar	39	<0.010	
04100088	Natural Bio Live Yogurt	Yeo Valley Organic	Fermented dairy products	19 NOV	B	150g	West Country	Plastic tub, sealed foil lid	39	<0.010	
04100089	English Mature Blue Stilton	Morrisons	Fermented dairy products	19NOV	None declared	200g	Healthmark UK ME 003 M EEC	Moulded plastic tray, heat sealed plastic lid	39	<0.010	
04100090	Organic Christmas Pudding	Duchy Originals	Other	APR 2006	L4222	454g	None declared	Plastic tub, plastic wrap, cardboard sleeve	40	0.020	0.003
04100091	Black Beans in Salted Sauce	Amoy	Fermented soy products	MAY2007	B 17	net 450g	Hong Kong	Can	27	<0.010	
04100092	Soy Bean Curd Regular Tofu	Shanghai Food Products	Fermented soy products	13 NOV 04	None declared	net 800g	None declared	Plastic tray, heat sealed plastic lid	9	<0.010	
04100093	Ajikurabe natto	Harro Foods	Fermented soy products	31/12/2005	90062	4 x 50g	Japan	Moulded polystyrene tray and lid	41	<0.010	
04100094	Pitted Green Olives in Brine	Crespo	Olives	MAY 29,07	L 150H SQ CH2 (sequential codes 25204 x 1, 25228 x 1)	net: 198g drained: 90g	Morocco	Glass jar	42	<0.010	

Retailers

- 1 Tesco Stores Ltd., Western Avenue, Gabalfa, Cardiff CF14 3AT
- 2 Ballantyne's Wine Merchants, 211-217 Cathedral Road, Pontcanna, Cardiff CF11 9PP
- 3 The China Supermarket, 32 Tudor Street, Riverside, Cardiff CF11 6AH
- 4 Asda Stores plc., Trafford Park, Barton Dock Road, Urmston, Manchester M41 7ZA
- 5 Tesco Stores Ltd., 60 Ellesmere Shopping Centre, Walkden, Worsley, Manchester M28 3BT
- 6 W H Lung, 83-97 Upper Brook Street, Manchester, M13 9TD
- 7 Safeway plc., 27-31 Central Way, Paisley, PA1 1EL
- 8 Wm Morrison Supermarkets plc., 89 Otley Road, Guiseley, Leeds LS20 8PS
- 9 New Loon Moon Supermarket, 9a Gerrard Street, London, W1D 5PN
- 10 Real Food Direct, Bryants Farm, Kiln Road, Dunsden, Reading RG4 9PB
- 11 Safeway plc., 60 Westgate, Otley, West Yorkshire LS21 3AS
- 12 Tesco Stores Ltd., 19 Springs Lane, Ilkley, West Yorkshire LS29 8UA
- 13 Wine Rack, 54 Skipton Road, Ilkley, West Yorkshire LS29 9EY
- 14 The Cooperative Group, 223 Royal George Parade, Upper Shoreham Road, Shoreham BN43 6TB
- 15 Somerfield plc., 119 London Road, Brighton, BN1 4HZ
- 16 Sainsburys plc., 361-367 Old Shoreham Road, West Hove, Sussex BN3 7GD
- 17 Tesco Stores Ltd., The Holmbush Centre, Upper Shoreham Road, Shoreham BN43 6TD
- 18 The Victoria Wine Company, 15/17 Moss Street, Paisley, PA1 1BE
- 19 Asda Stores plc., Phoenix Retail Park, Linwood Road, Paisley PA1 2AB
- 20 The Vintage, 37 Main Street, Randalstown, Co Antrim BT41 3AB
- 21 Winemark, 26-32 High Street, Antrim, BT41 4AN
- 22 Tesco Stores Ltd., 28 Castle Way, Antrim, BT41 4BU
- 23 Waitrose, 273 Ballards Lane, London, N12 8NR
- 24 Sainsburys plc., 836-852 High Road, North Finchley, London N12 9AN
- 25 Chigwell Stores, 6 Brook Parade, Chigwell, Essex IG7 6PE
- 26 Thresher Group, 126 Ballards Lane, Finchley, N3 2PA
- 27 Loon Fung Supermarket Ltd, 42-44 Gerrard Street, London, W1D 5QG
- 28 Sainsburys plc., 100 Regent Road, Salford, M5 4QU
- 29 W Wing Yip (Manchester) Ltd, Oldham Road, Ancoats, Manchester M4 5HU
- 30 Safeway plc., Neilston Road, Paisley, PA2 6JE
- 31 Sainsburys plc., Darnley, Glasgow, G53 7RH
- 32 Somerfield plc., Neilston Road, Paisley, PA2 9NB
- 33 Asda Stores plc., Cardiff Bay, Cardiff, CF11 0JR
- 34 Tesco Stores Ltd., 255 Cowbridge Road East, Canton, Cardiff CF11 9AN
- 35 Iceland Foods plc., 194 Cowbridge Road East, Canton, Cardiff CF5 1GW
- 36 Somerfield plc., Cowbridge Road East, Canton, Cardiff CF5 1JD
- 37 Marks & Spencer plc., Brookfield Centre, Half Hide Lane, Cheshunt EN8 0TZ
- 38 Tesco Stores Ltd., Brookfield Centre, Half Hide Lane, Cheshunt EN8 0TZ
- 39 Wm Morrison Supermarkets plc., 327 Southbury Road, Enfield, EN1 1TW
- 40 Waitrose, 98/101 Marylebone High Street, Marylebone, London W1M 4DD
- 41 Arigato Japanese Supermarket, 48-50 Brewer Street, London, W1R 3HN
- 42 Sainsburys plc., 15-17 Tottenham Court Road, London, W1T 1B

Annex – Comments from companies

MICHAEL WOOLLEY LTD Importer for GRANDES DISTILLERIES PEUREUX

NAME OF PRODUCT: LESGREVIL KIRSCH EAU DE VIE

“ The product complies with EU regulations regarding Ethyl Carbamate levels and there is no maximum legal level for Ethyl Carbamate in the UK. The manufacturer is supportive of the agency’s desire to encourage reduced levels of Ethyl Carbamate in beverages and is therefore currently working on a project to achieve this.”